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| EXAMINER |
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ZARNEKE, DAVID A

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 09/841,582 | Applicant(s) NISHIYAMA ET AL. | |
| | Examiner David A. Zarneke | Art Unit 2891 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6,7 and 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6,7 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 3/6/09 have been fully considered but they are not persuasive. Two arguments are presented with regarding the rejection of the claims.

First, it is argued that the amendment overcomes the product by process rejection.

This is correct and new grounds are given in light of this amendment.

The other argument is that the present invention has removed the need for a step of removing the epoxy adhesive from the chips because it uses the treatment to remove the adhesive properties.

Please note that the use of

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

Art Unit: 2891

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 6, 7, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Camien et al., US Patent 5,953,588, in view of Wolf, Silicon Processing for the VLSI Era, Volume 2:Process Integration, 1990, pp 334, 335 & 337.

Camien (figure 5 & 6) teaches a pseudo wafer structure comprising:

a plurality of semiconductor chips [106] each having at least their electrodes formed solely on one surface thereof (6, 33-36), wherein the one surface at which the electrodes are formed is releasably adhered to an adhesive layer of material that is secured to a substrate (4, 30-45:steps 1 & 9); wherein interspaces between each individual one of said chips and bottom surfaces thereof are continuously covered with said protective material [104], and the chips are bonded with each other via the protective material to thereby form the pseudo-wafer, there being substantially none of

Art Unit: 2891

the protective material formed on the one surface at which the electrodes are formed (figure 6 & 6, 33-36).

Camien fails to teach using a tested known good die.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a tested known good die in the invention of Camien because a tested known good die is conventionally known in the art to any and every skilled artisan. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07). One would want to ensure that the die used to form a package is a known good die (KGD) because it would be a waste of time and money to use a bad die. A manufacturer would want to protect its reputation by ensuring a good product that meets performance and functionality requirements (see Quirk et al, Semiconductor Manufacturing Technology, Prentice Hall, 2001, p 545-546 & Tummala et al., Microelectronics Packaging Handbook-Semiconductor Packaging, Part II, 2nd Edition, Chapman & Hall, 1997, p 39, last full paragraph).

Camien, which teaches performing “desired steps” on the active surface of the dies, fails to teach the electrodes being covered with a solder material for forming a solder ball.

It would have been obvious to one of ordinary skill in the art at the time of the invention to cover the electrodes with a solder material in order to form a solder ball because solder ball formation is a conventional, well-known in the art step to perform on exposed electrodes. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07).

Further, Camien fails to teach the use of a silicon dioxide layer formed over the one surface at which the electrodes are formed and a passivation layer formed over the silicon dioxide having openings at locations corresponding to the electrodes.

Wolf (pp 334-335 and Figure 5-16 on pp 337) teaches the use of a silicon dioxide layer formed over the one surface at which the electrodes are formed and a passivation layer formed over the silicon dioxide having openings at locations corresponding to the electrodes.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the silicon dioxide layer of Wolf in the invention of Camien because Wolf teaches this layer insulates the chip from the metal electrode, reduces the parasitic capacitance of the interconnect metallization layer, acts as a NA+ getter, and produces better step coverage (p 335, 1st full paragraph).

Camien, which teaches removing the adhesive (4, 30-45:steps 1 & 9 & 7, 1+), also fails to teach the adhesive layer of material loses its adhesive characteristics upon application of a specified treatment.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a specified treatment to cause the adhesive layer to lose its adhesive characteristics in place of the adhesive removal step of Camien because they are equivalent techniques used to separate one material from another at the adhesive layer, as evinced by US Patents 5,238,876, 5,534,102, and 5,976,955 (see the abstracts of each). The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16

Art Unit: 2891

USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950). Using a UV releasable adhesive would be safer for the environment and the chip itself by eliminating the need for an acid etch.

Regarding claim 7, Camien teaches the protective material comprises either one of an organic insulating resin and an inorganic insulating material in teaching that the material can be an epoxy (6, 24+).

In re claim 10, while Camien, which teaches only provides an example of using a chemical etch (7, 1+) to release the adhesive, fails to teach the adhesive properties of said adhesive layer of material sheet are released upon the application of ultraviolet light, it would have been obvious to one of ordinary skill in the art at the time of the invention to use ultraviolet in the invention of Camien because ultraviolet is a commonly known and used equivalent method of releasing the adhesive properties of an adhesive that is known to all skilled artisans, as evinced by US Patents 5,238,876, 5,534,102, and 5,976,955 (see the abstracts of each). The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950). Using a UV releasable adhesive would be safer for the environment and the chip itself by eliminating the need for an acid etch.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Zarneke whose telephone number is (571)-272-1937. The examiner can normally be reached on M-Th 7:30 AM-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kiesha Rose can be reached on (571)-272-1844. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2891

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David A. Zarneke/
Primary Examiner, Art Unit 2891
6/11/09